Claims

1. A compound of lithium nickel cobalt metal oxide having a formula, $LiaNi1-b-cCobMcO_2$;

wherein $0.97 \leqq a \leqq 1.05$, $0.01 \leqq b \leqq 0.30$, $0 \leqq c \leqq 0.10$;

wherein M is at least one metal selected from the group consisting of: manganese, aluminum, titanium, chromium, magnesium, calcium, vanadium, iron, and zirconium;

wherein said compound of lithium nickel cobalt metal oxide having a first (003) crystalline surface having a X-ray diffraction peak with an intensity of I_{003};

wherein said compound of lithium nickel cobalt metal oxide having a second (104) crystalline surface having an X-Ray diffraction peak with an intensity of I_{104}; and

wherein the ratio of said I_{003}/I_{104} is larger than 1.02.

2. The compound of lithium nickel cobalt metal oxide of claim 1, further comprising:

crystalline granules having granule diameters between 0.5μm and 4μm;

secondary granules having granule diameters between 10μm and 40μm; and

wherein the volume of said small crystalline granules is less then 10% of the volume of said compound of lithium nickel cobalt metal oxide.

3. The compound of lithium nickel cobalt metal oxide of claim 2 wherein said secondary granules are formed by the aggregation of said crystalline granules during calcination.

4. The compound of lithium nickel cobalt metal oxide of claim 2 wherein said crystalline granules are either spherically or elliptically shaped and said secondary granules are either spherically or elliptically shaped.

5. A compound of lithium nickel cobalt metal oxide, comprising:

crystalline granules having granule diameters between 0.5μm and 4μm;

secondary granules having granule diameters between 10μm and 40μm;

wherein said secondary granules are formed by the aggregation of said crystalline granules during calcination;

wherein said crystalline granules are either spherically or elliptically shaped;

wherein said secondary granules are either spherically or elliptically shaped;

wherein the volume of said small crystalline granules is less then 10% of the volume of said compound of lithium nickel cobalt metal oxide;

wherein said compound of lithium nickel cobalt having a formula $LiaNi1\text{-}b\text{-}cCobMcO_2$;

wherein $0.97 \leqq a \leqq 1.05$, $0.01 \leqq b \leqq 0.30$, $0 \leqq c \leqq 0.10$;

wherein M is at least one metal selected from the group consisting of: manganese, aluminum, titanium, chromium, magnesium, calcium, vanadium, iron, and zirconium;

wherein said compound of lithium nickel cobalt metal oxide having a first (003) crystalline surface having a X-ray diffraction peak with an intensity of I_{003};

wherein said compound of lithium nickel cobalt metal oxide having a second (104) crystalline surface having an X-Ray diffraction peak with an intensity of I_{104}; and

wherein the ratio of said I_{003}/I_{104} is larger than 1.02;

6. The compound of lithium nickel cobalt metal oxide of claim 1, wherein a method for fabricating said compound of lithium nickel cobalt metal oxide comprising the steps of:

forming a cobalt nickel hydroxy compound having a chemical formula of $Ni_{1-b}Co_b(OH)_2$;

ballgrinding to evenly mix a lithium compound, a compound of said metal M, and said cobalt nickel hydroxy compound;

calcining said mixture in a first oxygen atmosphere at between 600℃ and 720℃ for 1 hour to 10 hours to obtained a first calcined compound;

calcining said first calcined compound in a second oxygen atmosphere at between 750℃ and 900℃ for 8 hours to 20 hours to obtain a second calcined compound;

cooling said second calcined compound;

ballgrinding said cooled second calcined compound to obtain ballgrinded compound; and

sifting said ballgrinded compound to obtain said compound of lithium nickel cobalt metal oxide.

7. The fabrication method of claim 6 wherein said cobalt nickel hydroxy compound is spherically or elliptically shaped.

8. The fabrication method of claim 6, wherein said cobalt nickel hydroxy compound having D_{50} granule diameter, D_{10} granule diameter and D_{90} granule diameter;

wherein said D_{50} granule diameter $\geq 8\mu m$;

wherein said D_{10} granule diameter $\geq 4\mu m$; and

wherein said D_{90} granule diameter $\leq 30\mu m$.

9. The fabrication method of claim 8, wherein said cobalt nickel hydroxy compound is spherically or elliptically shaped.

10. The fabrication method of claim 6, wherein the method for forming said cobalt nickel hydroxy compound comprises the following steps:

mixing uniformly cobalt sulfate and nickel sulfate to form a first solution; and

adding ammonia to form a reaction solution wherein said first solution and ammonia react to form said cobalt nickel hydroxy compound.

11. The fabrication method of claim 10,

wherein said nickel sulfate having a concentration of between 1.5 mole/liter and 2 mole/liter;

wherein cobalt sulfate having a concentration of between 0.3 mole/liter and 0.5 mole/liter;

wherein said ammonia having a concentration of between 10 mole/liter and 14 mole/liter;

wherein said reaction solution having a temperature of between 40℃ and 60℃;

wherein said reaction solution having a pH of between 11 and 12; and

wherein said first solution and ammonia react for between 9 hours and 12 hours to form said cobalt nickel hydroxy compound.

12. The fabrication method of claim 10, wherein said cobalt nickel hydroxy compound having D_{50} granule diameter, D_{10} granule diameter and D_{90} granule diameter;

wherein said D_{50} granule diameter $\geq$ 8μm;

wherein said D_{10} granule diameter $\geq$ 4μm; and

wherein said D_{90} granule diameter $\leq$ 30μm.

13. The fabrication method of claim 10, wherein said cobalt nickel hydroxy compound is spherically or elliptically shaped.

14. The fabrication method of claim 11,

wherein said cobalt nickel hydroxy compound having D_{50} granule diameter, D_{10} granule diameter and D_{90} granule diameter;

wherein said D_{50} granule diameter $\geq$ 8μm;

wherein said D_{10} granule diameter $\geq$ 4μm;

wherein said D_{90} granule diameter $\leq$ 30μm; and

wherein said cobalt nickel hydroxy compound is spherically or elliptically shaped.

15. The fabrication method of claim 6 wherein said first oxygen atmosphere and said second oxygen atmosphere are between 0.08MPa and 0.1MPa.

16. The fabrication method of claim 6 wherein the ratio of the molar content of Li/(Li+Co+M) is between 1.01 and 1.10.

17. The fabrication method of claim 6 wherein said mixture having a thickness $\leq$ 5 cm. and said first calcined compound having a thickness $\leq$ 5 cm.

18. The fabrication method of claim 6 wherein in said cooling step, the second calcined compound is cooled rapidly in dry air;

19. The fabrication method of claim 15,

wherein the ratio of the molar content of Li/(Li+Co+M) is between 1.01 and 1.10;

wherein said mixture having a thickness ≤5 cm. and said first calcined compound having a thickness ≤ 5 cm; and

wherein in said cooling step, the second calcined compound is cooled rapidly in dry air.

20. The fabrication method of claim 11,

wherein said first oxygen atmosphere and said second oxygen atmosphere are between 0.08MPa and 0.1Mpa;

wherein the ratio of the molar content of Li/(Li+Co+M) is between 1.01 and 1.10;

wherein said mixture having a thickness ≤5 cm. and said first calcined compound having a thickness ≤ 5 cm; and

wherein in said cooling step, the second calcined compound is cooled rapidly in dry air.